

**Study Guide**

For use with pages 5–9

**GOAL** Evaluate and write variable expressions.**VOCABULARY**

A **numerical expression** consists of numbers and operations. For example, the expression  $10 - 4$  is a numerical expression.

A **variable** is a letter used to represent one or more numbers.

A **variable expression** consists of numbers, variables, and operations. For example, the expression  $10 - c$  is a variable expression.

To **evaluate** a variable expression, substitute a number for each variable and evaluate the resulting numerical expression.

A **verbal model** describes a problem using words as labels and using math symbols to relate the words.

**EXAMPLE 1** Evaluating a Variable Expression

You have \$120 in your bank account. You can evaluate the expression  $120 + d$  when  $d = 28$  to find the amount you have in your bank account after you deposit \$28.

**Solution**

$$\begin{aligned} 120 + d &= 120 + 28 && \text{Substitute 28 for } d. \\ &= 148 && \text{Add.} \end{aligned}$$

**Answer:** You have \$148 in your bank account.

**Exercises for Example 1**

Evaluate the expression when  $m = 9$ .

1.  $m + 12$
2.  $5m$
3.  $24 - m$
4.  $\frac{36}{m}$
5. An average male cheetah travels about 4 miles per day. Evaluate the expression  $4 \cdot c$  when  $c = 365$  to find about how many miles a cheetah travels in a year.

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**EXAMPLE 2 Evaluating Expressions with Two Variables**Evaluate the expression when  $a = 6$  and  $b = 18$ .

$$\begin{array}{ll} \text{a. } b - a = 18 - 6 & \text{Substitute 18 for } b \text{ and 6 for } a. \\ & = 12 \quad \text{Subtract.} \end{array}$$

$$\begin{array}{ll} \text{b. } \frac{b}{a} = \frac{18}{6} & \text{Substitute 18 for } b \text{ and 6 for } a. \\ & = 3 \quad \text{Divide.} \end{array}$$

**Exercises for Example 2**Evaluate the expression when  $x = 14$ ,  $y = 7$ , and  $z = 4$ .

6.  $xz$

7.  $z + y$

8.  $\frac{x}{y}$

9.  $y - z$

**EXAMPLE 3 Writing a Variable Expression**

Grove City, Pennsylvania received 5 fewer inches of rain this year than last year.  
 Use a verbal model to write a variable expression for the number of inches of rain Grove City received this year if you know the number of inches of rain Grove City received last year.

**Solution**

Let  $n$  represent the number of inches of rain Grove City received last year.  
 The word *fewer* indicates subtraction.

$$\begin{array}{l} \text{Inches this year} = \text{Inches last year} - 5 \\ = n - 5 \end{array}$$

**Answer:** The number of inches of rain Grove City received this year is  $n - 5$ .**Exercises for Example 3**

Write a variable expression to represent the phrase.

10. The difference of 17 and a number

11. The quotient of a number and 5

12. 10 more than a number